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A NEW GENUS OF THE PLEUROTHALLIDINAE

BY
OAKES AMES

THE ORIGINAL COLLECTION of *Pleurothallis floripecten* Reichb.f., which I believe represents a new genus, was made by Hermann Wagener near Jaji in Venezuela and was described by H. G. Reichenbach in Bonplandia 2 (1854) 25. So far as I know, only two specimens were studied by Reichenbach when he described the species. One of these is preserved in the Reichenbachian herbarium in Vienna; the other was presented to John Lindley by Reichenbach and is preserved in the Lindley Herbarium at Kew. Later, what Reichenbach thought to be the same species was represented by a living specimen in the collection of W. Wilson Saunders at Reigate, England. Saunders obtained this specimen from M. Linden of Brussels, but whether or not it came originally from Venezuela is not known.

The relationship between *Pleurothallis floripecten* and its closest allies has heretofore never been thoroughly investigated. There are two substantial reasons why this should be so. First, *P. floripecten* has proved to be exceedingly rare; secondly, those species which resemble it closely have also proved to be rare. Two of these species which were originally assigned to Lepanthes by Barbosa Rodriguez, were transferred by Cogniaux in Martius'

Flora Brasiliensis to Pleurothallis on the evidence of sketches, there being no specimens available for critical study. That these Brazilian species were aberrant is evinced by the fact that Cogniaux proposed for their reception the new section Lepanthopsis. Later, in Urban's Symbolae Antillanae, Cogniaux recognized *Pleurothallis anthoctenium* Reichb.f., a West Indian species, as being referable to the alliance formed by the Brazilian species and he introduced the section Lepanthopsis in Symbolae Antillanae to receive *P. anthoctenium*.

To establish generic boundaries in the Pleurothallidinae vegetative characters have proved to be without weight. The perianth has also proved inadequate as various degrees of cohesion between the sepals, while relied on for generic distinction, have been found useless because of misleading exceptions. The only structure that is fundamentally serviceable is the gynostemium, an organ that is desperately difficult to reconstruct and interpret when it has been crushed by the pressure used in preserving specimens for the herbarium, although in living specimens it exhibits clearly marked characters which are serviceable in differentiating major groups or genera.

The gynostemium of *Pleurothallis floripecten* and *P. anthoctenium* is very unlike what obtains in *P. ruscifolia* (Sw.) R.Br., the type of the genus Pleurothallis. The receptive stigmas are widely separated (cf. plate of *Lepanthopsis floripecten*, fig. 4, the heavily stippled area) and at anthesis are not conspicuously confluent along the frontal margin of the clinandrium beneath the rostellum as in *P. ruscifolia*; at the base the gynostemium is apodal, and at the summit conspicuously dilated with the posterior margin of the clinandrium cucullate. In *P. ruscifolia* the gynostemium is more or less elongated, cylindrical with a pulvinate foot, and an obliquely truncate apex. The stigmatic lobes of *P. floripecten* are suborbi-

cular and spreading. The anther is transversely elongated and contains two large, waxy pollinia. The widely separated functional areas of the stigmas at the dilated summit of the footless gynostemium are sufficient evidence to indicate that *P. floripecten* is generically distinct from *P. ruscifolia.* (cf. plate of *P. ruscifolia*).

The mere mention of widely separated receptive stigmas, to one familiar with the genera of the Pleurothallidinae, should suggest the highly technical genus Stelis, and were it not for the very unusual perianth and the lepanthiform vegetative structures, I think that one would be inclined to refer *P. floripecten* to Stelis. But this would be a debatable procedure. To make this clear several flowers of characteristic species of Stelis are here figured. I do not believe that it would be conformable to sound practice to remove *P. floripecten* and its allies from Pleurothallis and transfer them to Stelis. They would constitute as aberrant a group in Stelis as they surely do in Pleurothallis. (cf. plate of Stelis species).

Barbosa Rodriguez in his studies of the Brazilian species concluded that they were referable to Lepanthes. Vegetatively they are lepanthiform and the widely spreading connate sepals resemble very closely the sepals of certain species of Lepanthes, but the petals, labellum and gynostemium are very different from what obtains in that genus.

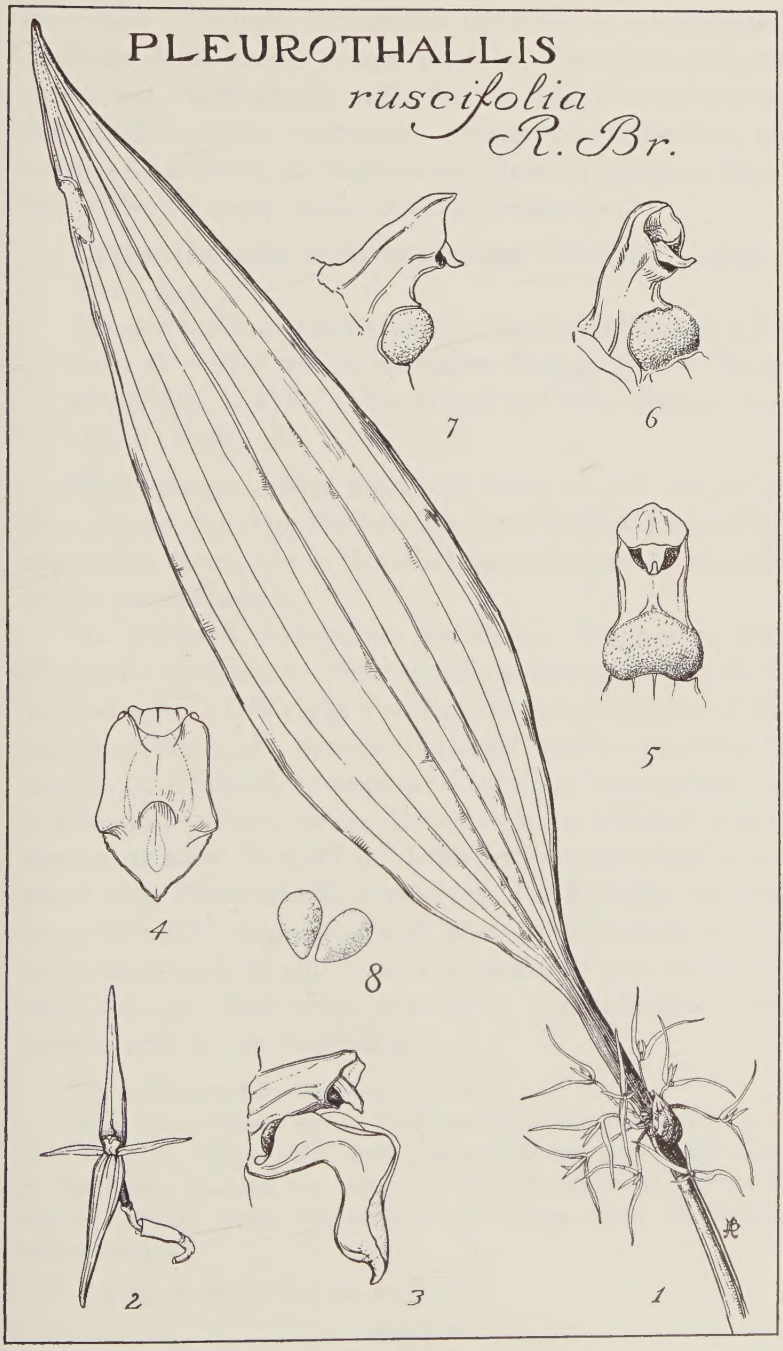
In my opinion the species of the section Lepanthopsis represent a distinct genus.

Lepanthopsis *Ames, gen. nov.*

Sepala plus minusve subaequalis, patentia, breviter vel conspicue connata; lateralia altius connata. Petala multo breviora, membranacea, orbicularia vel elliptica. Labellum ad basin columnae sessile, simplex, valde membranaceum. Columna brevissima, apoda, antice utrinque lobo plus minusve carnoso instructa; lobis columnae stig-

EXPLANATION OF ILLUSTRATION

PLEUROTHALLIS RUSCIFOLIA (*Jacq.*) *R. Br.* 1, leaf and inflorescence natural size, drawn from a Jamaican plant (*W. R. Maxon 9486*). 2, flower much enlarged. 3, labellum and column much enlarged (anther removed). 4, labellum much enlarged. 5, 6 & 7, column much enlarged, to show pulvinate foot, rostellum and stigmatic orifice under the rostellum (anther removed). 8, pollinia much enlarged.


PLEUROTHALLIS
ruscifolia
R. Br.
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matiferis. Anthera terminalis, opercularis, incumbens. Pollinia duo, cerea, subpyriformia. Caules secundarii caespitosi, monophylli, infra folium vaginis anguste infundibuliformibus instructis. Pedunculi terminales, ad basin folii solitarii vel fasciculati. Racemi elongati, floribus distichis saepe transversis, alternantibus.

Lepanthopsis anthoctenium (*Reichb.f.*) *Ames, comb. nov.*

Pleurothallis anthoctenium Reichenbach filius in Linnaea 41 (1876) 94; in Saunders Refug. Bot. 2 (Aug. 1878) sub. t. 118 [1] —Cogniaux in Urban Symb. Antill. 6 (1909) 433.

This species differs markedly from *L. floripecten* in the strigose hairs on the tubular sheaths that conceal the secondary stems and in the labellum being nearly as wide as the lateral sepals.

In Urban's Symbolae Antillanae, Cogniaux cites Wright's 1509 under *Pleurothallis melanantha* Reichb.f. Indeed some of Wright's collections are mixtures of his numbers 3342 (*P. melanantha*) and 1509, otherwise it would be difficult to explain Cogniaux's procedure in confusing two very dissimilar species. In Lindley's herbarium at Kew, Wright no.1509 is mounted on the same sheet with *Pleurothallis floripecten*. In the Gray Herbarium Wright's nos. 1509 and 3342 are mounted on the same sheet and in this case it is apparent that both no. 1509 and no. 3342 are a mixture of *Lepanthopsis melanantha* and *L. anthoctenium*.

Haiti, *Poiteau* fide Reichb.f. loci cit.

Cuba, Prope villam Monte Verde dictum, Cuba Orientale. Jan.–July 1859. *C. Wright 1509*: Valley of the Rio Bayamita, south slope of the Sierra Maestra, ten meters up on tree trunk, at 900–1,050 meters altitude. April 5–7, 1907. *W. R. Maxon 3949*. (U. S. Nat. Herb. 522574).

[1] For discussion of date see page 32.

EXPLANATION OF ILLUSTRATION

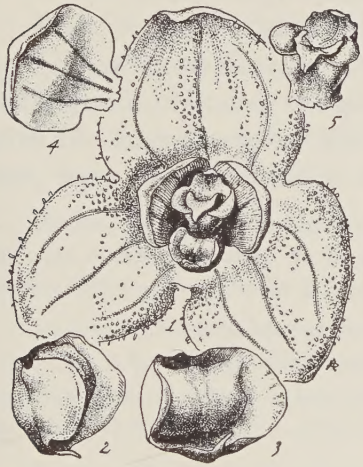
STELIS ENDRESII *Reichb.f.* 1, flower from the type specimen (×8). 2, labellum side view. 3, labellum as seen from above. 4, petal. 5, gynostemium (anther removed) showing lateral stigmas and the triangular rostellum.

STELIS POWELLII *Schltr.* 1, flower from the type specimen (× about 9). 2, labellum as seen from above. 3, labellum oblique side view. 4, gynostemium (anther removed) showing lateral stigmas and linguiform rostellum. 5, petal.

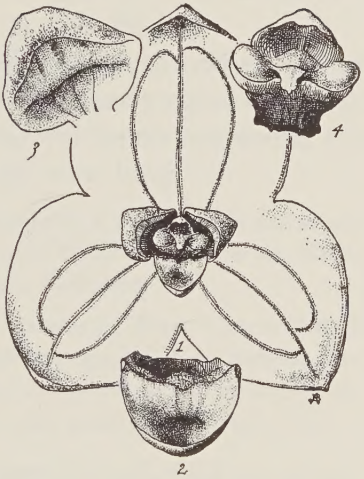
STELIS VESTITA *Ames* 1, flower from the type specimen (× about 10). 2, labellum as seen from above. 3, gynostemium (anther removed) showing lateral stigmas and linguiform rostellum.

STELIS NUBIA *Ames* 1, flower from the type specimen (× about 7). 2, labellum as seen from above. 3, petal. 4, gynostemium (anther removed) showing lateral pulvinate stigmas and linguiform rostellum.

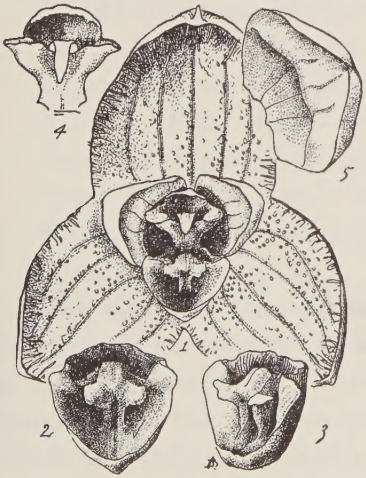
STELIS *Endresii Reichb.f.*



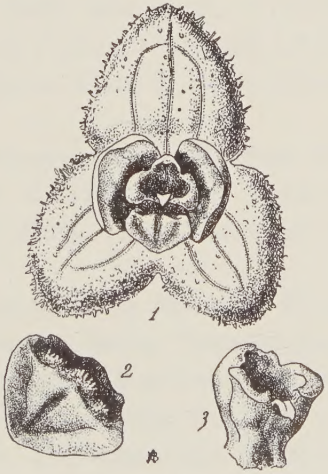
STELIS *nubis Ames*



STELIS *Powellii Schltr.*



STELIS *vestita Ames*



Lepanthopsis densiflora (*Rodr.*) *Ames, comb. nov.*

Lepanthes densiflora Rodriguez in Vellosia 1, ed. 2 (1891) 119.

Pleurothallis congestiflora Cogniaux in Martius Fl. Bras. 3, pt. 4 (1896) 591, t. 113, fig. 4.

Lepanthopsis densiflora differs from the other species of the genus in having the labellum nearly equal in length with the lateral sepals. The lateral sepals are about 1.5 mm. long, the labellum is 1.25 mm. long.

Brazil, As avores dos lugares sombrios e humidos da matta que circunda o cume da serra de S. José d'El-Rei, provincia de Minas Geraes. Floresce em Junho e Agosto. *Rodriguez.*

Illustration: Reproduced from Martius Fl. Bras. 3, pt. 4 (1896) t. 113, fig. 4 (as *Pleurothallis congestiflora* Cogn.). Plant, natural size. 3, lateral sepal. 4, petal. 5, labellum. 7 a, labellum and gynostemium as seen from the front. 7 l, labellum and gynostemium side view.

Lepanthopsis floripecten (*Reichb.f.*) *Ames, comb. nov.*

Pleurothallis floripecten Reichenbach filius in Bonpl. 2 (1854) 25; in Walpers Ann. Bot. Syst. 6 (1861) 175; in Saunders Refug. Bot. 2 (Aug. 1878) sub. t. 118.

Lepanthes secunda Rodriguez Gen. & Spec. Orch. Nov. 2 (1882) 70.

Pleurothallis unilateralis Cogniaux in Martius Fl. Bras. 3, pt. 4 (1896) 592, t. 122, fig. 2—Ames & Schweinfurth in Gleason in Bull. Torr. Bot. Club 58 (1931) 346.

The sketch of the Brazilian plant in Martius' Flora Brasiliensis represents the leaves as being broader than in the specimens from Venezuela and Honduras, but the structure of the flowers presents nothing tangible on which to establish distinctions. The specimens collected on Mt. Duida have slightly larger flowers than the Brazilian and Honduran specimens, but there seems to be nothing more significant on which to rely in attempting

separation.

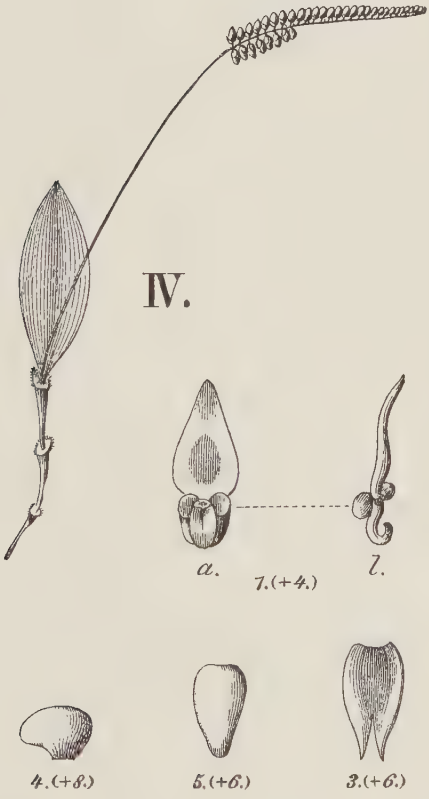
In the flowers I have examined the labellum is by no means so cordate as in Reichenbach's analytical sketches, but it is probable that in the plate prepared for Saunders Refugium Botanicum the tendency toward a cordiform base was overemphasized. Indeed, in the original sketch of the labellum of the Wagener plant, Reichenbach's outline of the basal portion indicates uncertainty, because he modified his drawing with supplementary lines.

The plate in Saunders Refugium Botanicum shows yellow sepals strongly suffused with mauve along the nerves, petals which are yellowish on the lower half and mauve on the upper half and the labellum yellowish-green with a mauve border. In the dried specimens I have examined, the flowers appear to have been yellowish throughout and in his description of Wagener's plant Reichenbach described the flowers as being yellowish when dry. However, Saunders' plant is structurally so similar to the ones from Mt. Duida and from Honduras that it would be unwise to regard them as distinct species until more material has been seen. Reichenbach's drawing and his description of the gynostemium are misleading and should be disregarded.

The following description and notes are based on the specimens collected in Honduras by Edwards.

Plants 3–12.5 cm. tall. Roots glabrous, whitish, fibrous. Secondary stems ascending, densely caespitose, variable in length, slender, 5–70 mm. long, completely concealed by two to six closely appressed elongated tubular sheaths, monophyllous. Sheaths up to 1.5 cm. long, gradually dilated upward, terminating in an infundibuliform marginate ostium; margin of the ostium muriculate or very finely hispidulous. Leaf coriaceous, oblong-elliptic, marginate, very shortly petiolate, 1.5–3.7 cm. long, up to 9 mm. wide, bidentate at the apex with the mid-

LEPANTHOPSIS
densiflora (*Rodr.*) *Ames*



nerve projecting. Peduncles one to four in the axil of the leaf, up to 6 cm. long, filiform, rigid, with several remote abbreviated tubular bracts. Raceme about 1.5 cm. long, bearing as many as twenty distichously placed yellow flowers. Bracts of the raceme infundibuliform, scarious, equaling the pedicels of the flowers. Flowers .75 mm. apart, transversely attached, contiguous. Lateral sepals about 3 mm. long, connate to within 1 mm. of the tip, forming an oblong bifid lamina 1.5 mm. wide, conspicuously carinate on the exterior surface, acute or subacute, united at base with the dorsal sepal, 1–nerved. Dorsal sepal 2 mm. long, 1 mm. wide, ovate, obtuse or subacute. Petals spreading, about .5 mm. long, oblong-elliptic, rounded at the apex, 1–nerved. Labellum 1 mm. long, scarcely 1 mm. wide, elliptical, conspicuously 3–nerved. Column very short, dilated upward; stigmas orbicular, widely separated. Anther papillose. Pollinia two.

In the enlarged drawing of the raceme, two flowers near the summit are shown with the dorsal sepal inflexed. This condition seems to accompany the development that follows pollination. In flowers that exhibited this peculiarity I found pollen masses adhering to the stigma. The petals had become inflexed in such a way that they concealed the column; the dorsal sepal was closely applied to them, so as to form a protective covering over the pollinated stigmas.

In Edwards' specimens there is a wide range in the size of the plants. The production of the first raceme occurs when vegetative development is characterized by very short secondary stems. As the second, third and fourth peduncles appear, vegetative development has progressed rapidly. This phenomenon is clarified by two drawings, one showing a young plant that is flowering for the first time, the other showing an elongated stem which bears four peduncles.

Republic of Honduras, Department of Comayagua, Minas de Oro. Epiphyte in mountain forest, 4,200 feet altitude. Flowers sulphur color. July 5, 1932. *J. B. Edwards 194;* Siguatepeque. Epiphyte in open pine forest, 4,000 feet altitude. Flowers pale yellow. September 22, 1932. *J. B. Edwards 252.*

Colombia, Reported by Schlechter as probably having been found in North Santanda.

Venezuela, near Jaji. *Hermann Wagener;* Summit of Mount Duida, Epiphyte in woods, 4,400 feet altitude. *G. H. H. Tate 825.*

Brazil, Croissant sur les arbres des forêts qui couvrent les montagnes près Rodeio et à la Province du Ceará. Fleurit en Mars. *Fr. Allemao 1490* fide Rodriguez loc. cit.

Illustration: 1, secondary stem (natural size) with four peduncles showing that the stem elongates as the successive peduncles are produced. 2, general habit (natural size) showing that the stems are comparatively short when the first peduncle is produced. 3, flower much enlarged. 4, gynostemium much enlarged. The heavily stippled areas represent the lateral stigmas. 5, labellum much enlarged. 6, petal much enlarged. 7, anther much enlarged showing the under side. 8, pollinia much enlarged. 9, peduncle and raceme much enlarged.

Two other species that appear to belong in Lepanthopsis, namely *Pleurothallis melanantha* Reichb.f. and *P. microlepanthes* Griseb., are represented in herbaria by material that is difficult to analyze. *P. melanantha* was described from fruiting specimens with the perianth organs persisting. The gynostemium had suffered changes which obscure the structure that characterized the flowers before pollination was effected. *P. microlepanthes* in its post-pollination phases closely resembles *P. melanantha* while at anthesis the gynostemium suggests the structure that characterizes *Lepanthopsis floripecten*. It seems likely that both *P. melanantha* and *P. microlepanthes* are in the same alliance formed by *L. floripecten* and *L. anthoctenium*, yet they appear to differ conspicuously from these species in the aspect of the inflorescence. Vegetatively and in the plan of the perianth they suggest *L. anthoctenium* very closely, with the dorsal sepal more ex-


LEPANTHOPSIS floripecten Ames
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tensively connate with the laterals.

In the illustration of *Lepanthopsis microlepanthes*, fig. 5 clearly shows the post-pollination aspect of the gynostemium. The semi-globular protuberances, one with a pollinium attached to its summit, represent the extraordinary development that takes place after pollination is effected. This development of the stigmas is also found in *L. melanantha* and in *Pleurothallis ruscifolia*, but if my conclusions are justified, the end-result simply masks, in *P. ruscifolia*, the structural peculiarities antecedent to pollination.

In adding *P. melanantha* and *P. microlepanthes* to Lepanthopsis it should be remarked that they differ conspicuously from *L. floripecten* in the nature of the inflorescence. The flowers are not transversely inserted, but are distichous and in two ranks.

Lepanthopsis melanantha (*Reichb.f.*) *Ames, comb. nov.*

Pleurothallis floripicta Lindley in Mem. Amer. Acad. 8 (1861) 219, *nomen tantum.*

Pleurothallis melanantha Reichenbach filius in Flora 48 (1865) 275—Cogniaux in Urban Symb. Antill. 6 (1909) 430; 8 (1920) 126.

It was noted above under *Lepanthopsis anthoctenium*, that in Urban's Symbolae Antillanae, Alfred Cogniaux had referred Wright's Cuban plants distributed under numbers 1509 and 3342 to *Pleurothallis melanantha.* The only satisfactory explanation of this procedure seems to be that the plants representing these numbers were a mixture or at least that no. 1509 is represented by both species. In the Gray Herbarium where the plants numbered 1509 and 3342 are mounted on the same herbarium sheet, *Lepanthopsis anthoctenium* and *L. melanantha* are represented under both numbers. Although these species

EXPLANATION OF ILLUSTRATION

LEPANTHOPSIS FLORIPECTEN (*Reichb.f.*) *Ames* Reproduced from Martius Fl. Bras. 3, pt. 4 (1896) t. 122, fig. 2 (as *Pleurothallis unilateralis* Cogn.). Plant, natural size. 1, flower. 2, dorsal sepal. 3, lateral sepal. 4, petal. 5, labellum. 6 a, gynostemium as seen from the front. 6 d, gynostemium as seen from above. 6 l, gynostemium side view.

LEPANTHOPSIS

floripecten (*Reichb.f.*) *Ames*

are markedly distinct, they are very similar in the vegetative structures and difficult to distinguish apart when sterile, unless, as I think is true, the margin of the leaf of *L. anthoctenium* always has the appearance of being serrate, while the leaf of *L. melanantha* has a smooth or unserrated margin. In the specimens I have examined this distinction has been constant.

Reichenbach's description of *Pleurothallis melanantha* is, I think, misleading because in it he characterizes the petals as being ligulate. In his herbarium the sketch that accompanies the Wright plant shows the petals much longer than wide and conspicuously 1-nerved. In the specimens of Wright 3342 (the type number of *Pleurothallis melanantha*), that I have examined, I have found the petals to be nearly orbicular and without a conspicuous median nerve. Reichenbach described the labellum as being cordiform, acute. In the flowers of the type number that I have examined the labellum is cordiform, obtuse. Perhaps there is much variation in the perianth organs of *Lepanthopsis melanantha* and my observations may differ from Reichenbach's because my material represents one of the variants.

The gynostemium of *Lepanthopsis melanantha* is difficult to interpret because the flowers available for study are old with the subtending capsules about ready to dehisc. Unfortunately this species does not appear to be available in perfect condition. In the flowers of Wright 3342 the gynostemium has terminal stigmas. These stigmas are very small and form two erect, conical or subglobose masses which are contiguous through the centre of the clinandrium. It would seem that the generic affinity is rather with Lepanthopsis than with Pleurothallis.

Cuba, 1860-1864. *C. Wright 3342.*

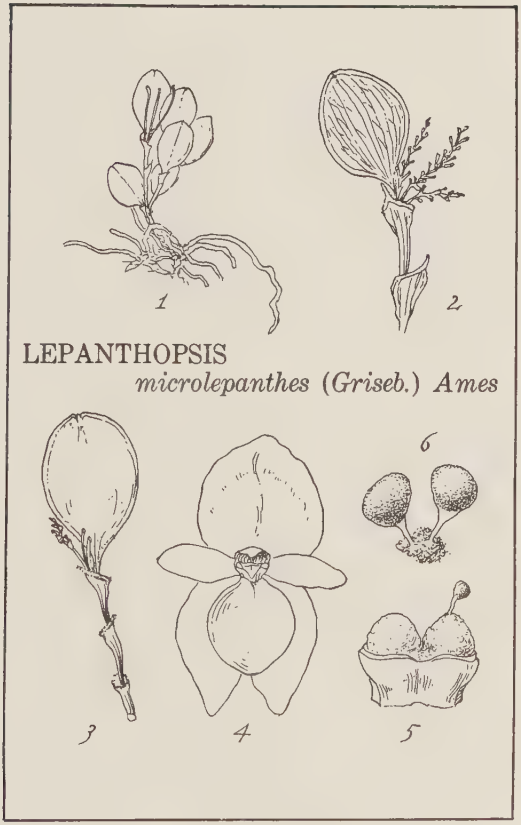
Santo Domingo, Prope Constanza in sylva frondosa 1250 m. *Tuerckheim 3089* fide Cogniaux in Urb. Symb. Antill. 8 (1909) 126.

Lepanthopsis microlepanthes (*Griseb.*) *Ames, comb. nov.*

Pleurothallis microlepanthes Grisebach Fl. Brit. West Ind. (1864) 610—Cogniaux in Urban Symb. Antill. 6 (1909) 430—Fawcett & Rendle Fl. Jam. 1 (1910) 65.

My conception of this species is based on the specimens in the Herbarium of the New York Botanical Garden and on a drawing in my herbarium of the Wilson plant collected in 1857 and preserved at Kew. The gynostemium of the Cuban specimens suggests very closely the gynostemium of *L. melanantha*. The flowers of Léon, Clement & Roca no. 10371 are described as having been yellow. Lateral sepals 1 mm. long, connate for the greater part of their length, forming an ovate, apically bifid lamina which is only slightly longer than the labellum. Dorsal sepal very broadly ovate, obtuse, about 1 mm. long. Petals less than 1 mm. long, about half as long as the dorsal sepal is wide, narrowly elliptical, obtuse. Labellum obscurely or very shortly clawed, apparently sessile, orbicular, smooth, ecallose, slightly less than 1 mm. long. All the perianth organs are tenuous and without conspicuous nerves. Gynostemium minute, slightly dilated above the middle, the stigmas after pollination become much swollen and form erect, terminal, semi-globular protuberances which occupy almost the entire area of the clinandrium.

The diminutive gynostemium is very difficult to interpret from dried specimens, consequently information regarding the exact position and nature of the stigmas antecedent to pollination will have to await studies of fresh material. That the stigmas are terminal and in conformity to the generic characters herein emphasized is indicated by post-pollination developments. (cf. illustration, fig. 5). That they are lateral and, in the early stages of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LEPANTHOPSIS
microlepanthes (Griseb.) Ames
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anthesis, confined to the anterior margin of the androclinium, as in *L. floripecten*, seems probable.

Cuba, Loma del Gato and vicinity, Cobre Range of Sierra Maestra. In woods at 1,000 meters altitude. July 11–August 14, 1921 *Léon, Clement & Roca 10371.* (Herb. N.Y. Bot. Gard.) ; same locality. July 11–August 14, 1921. *Léon, Clement & Roca 10548* (Herb. N.Y. Bot. Gard.).

Jamaica, *Macfayden: Wilson: March:* Mabess River, *Harris.*

Illustration: 1, from a drawing of the Wilson plant in Herb. Kew., natural size. 2, from a drawing of a leaf and stem of the Wilson plant (enlarged). The ciliations of the sheaths not shown. 3, leaf and stem of the Cuban plant (no. 10371) twice larger than natural size. 4, flower of the Cuban plant (no. 10371) much enlarged. 5, column of the Cuban plant (no. 10548) showing the post-pollination condition of the stigmas, much enlarged, with a pollinium attached to one of the stigmas. 6, pollinia of the Cuban plant (no. 10371) much enlarged, imbedded in the glutinous material of the rostellum.

Notes on the following illustration: The petals of *L. melanantha* as interpreted by Reichenbach are narrower and longer than those of Wright's 3342 (type number) in the Gray Herbarium, and the labellum is acuminate rather than rounded at the apex as in the specimens of Wright 3342 in the Gray Herbarium. Furthermore the petals of the Gray Herbarium specimen lack a distinct median nerve.

The enlarged drawings of the flowers and the accompanying analyses are from Reichenbach's drawings in the Reichenbachian Herbarium. With the exception of *g*, which is much reduced, all of the analytical drawings are practically equal in size to the originals.

It may be noted that the sepals in Reichenbach's drawing of *Lepanthopsis floripecten* are longer in relation to the labellum than is true of Edwards' plant. In this regard it is worthy of remark that Lindley's sketch of a flower of the Wagener plant resembles the flowers of the Edwards plant very closely. Allowance must of course

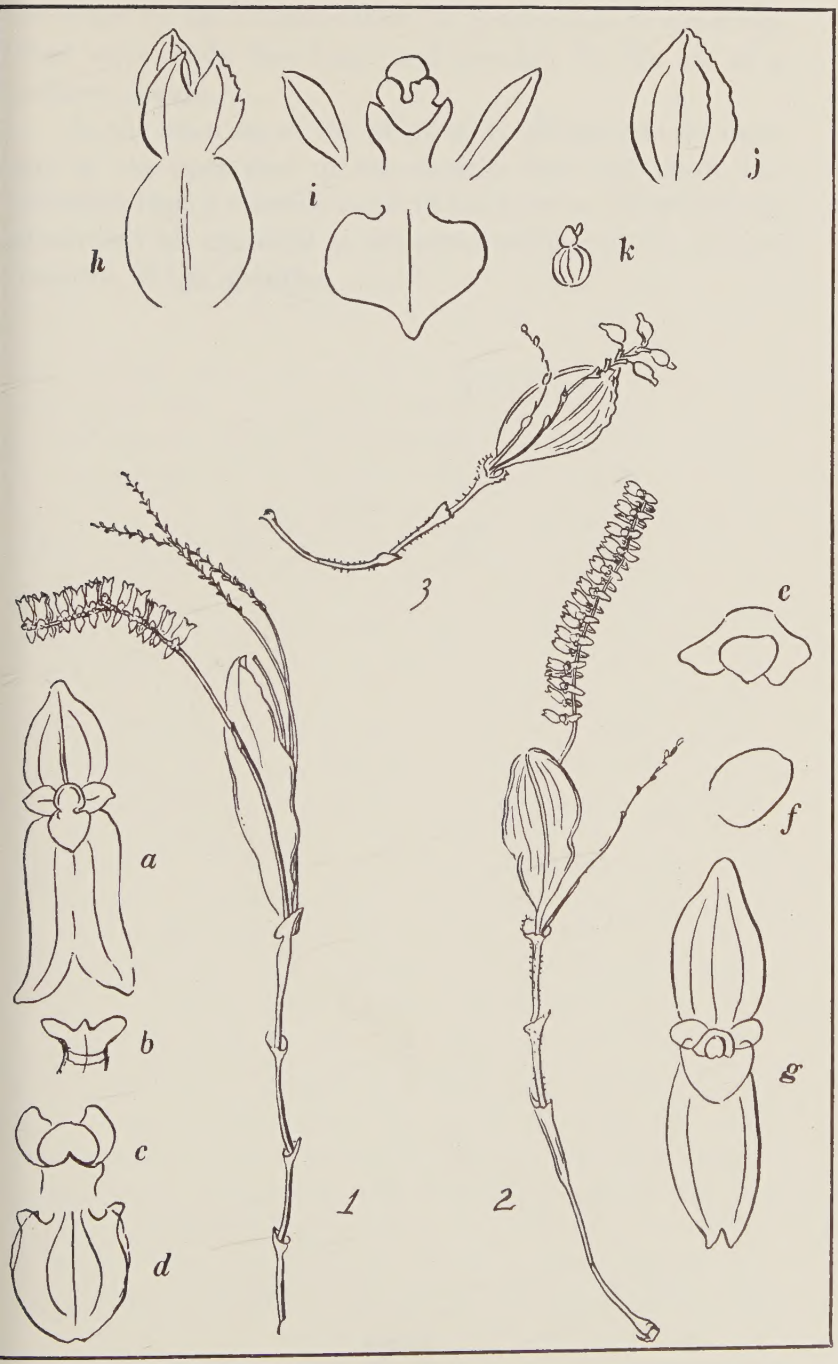
EXPLANATION OF ILLUSTRATION

LEPANTHOPSIS FLORIPECTEN (*Reichb.f.*) *Ames* 1, plant drawn natural size from type sheet of *Pleurothallis floripecten* Reichb.f. in the Reichenbachian Herbarium. a, flower from a tracing of the original drawing. b, front view of the column. c, posterior view of the column. d, labellum.

LEPANTHOPSIS ANTHOCTENIUM (*Reichb.f.*) *Ames* 2, plant drawn natural size from a specimen in the Reichenbachian Herbarium. e, column. f, petal. g, flower (drawn somewhat smaller than the original).

LEPANTHOPSIS MELANANTHA (*Reichb.f.*) *Ames* 3, plant drawn natural size from the Wright plant, the type of *Pleurothallis melanantha* Reichb.f. in the Reichenbachian Herbarium. h, capsule with the persistent sepals. i, petals, column and labellum. j, dorsal sepal. k, flower and capsule slightly enlarged.

Figures a–k copied from original drawings made by H. G. Reichenbach.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be made in the consideration of proportions in drawings that were made free-hand and unaided by the use of a camera-lucida.

In the drawing of the plant of *L. floripecten* the margin of the open end of the sheaths does not show the ciliation that is characteristic of the species. Reichenbach described his material as densely fimbriate at the dilated mouths of the sheaths.

SAUNDERS REFUGIUM BOTANICUM

VOLUME II

BY

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VOLUME TWO of Saunders Refugium Botanicum was issued in three parts. The dates of publication are open to doubt and have been a source of confusion. Fortunately Professor Ames' copy of the second volume contains the original covers and these materially help to establish the dates, but nevertheless fail to remove entirely uncertainty regarding the actual dates of issue.

The covers bear the following dates: Part 1, June 1869 containing plates 73 to 96 inclusive; Part 2, October 1872 (corrected in ink to August 1878) containing plates 97 to 120 inclusive; and Part 3, June 1882 containing plates 121 to 144 inclusive. A discussion of the accuracy of these dates seems to be necessary.

Part 1. Although the cover and plates are dated June 1869 the first notice regarding Part 1 seems to be in the Journal of Botany, volume 8 (March 1, 1870) 60 which reads, "The first part of the second volume of Mr. Wilson Saunders' 'Refugium Botanicum' has just appeared." From the evidence at hand it would seem that Part 1 did not appear until early in 1870.

Part 2. While the plates all bear the date of October 1872 the evidence seems to indicate that Part 2 was not issued until a much later date. In the copy of volume two at the Gray Herbarium there is a paster sent out by the publishers apologizing for the late appearance of this part. Furthermore, in the American Journal of Science and Arts, series 3, volume 8 (1879) 155 a review referring to volume two is in part as follows: "There is now a second part bearing the date 1878..." Consequently, it would seem advisable to accept August 1878 as corrected on the part cover in Professor Ames' copy as the actual date of publication.

Part 3. In spite of the fact that the plates of this part are dated November and December 1872, it seems certain that Part 3 did not appear until a much later date. In Just Jahresbericht for 1882 (volume 10, part 2 (1885) 76) there is a review and abstract of this part which definitely states the date of publication as 1882, which is in accordance with the date (June 1882) given on the cover of Professor Ames' copy.

Therefore, on the evidence at hand, it would seem that Part 1 appeared early in 1870; Part 2 in August 1878 and Part 3 in June 1882.

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